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(71) Applicant: C. van der Lely N.V.
Weverskade 10
P.O. Box 26
NL-3155 ZG Maasland(NL)

(72) Inventor: van der Lely, Cornelis
7, Brüschenrain
CH-6300 Zug(CH)

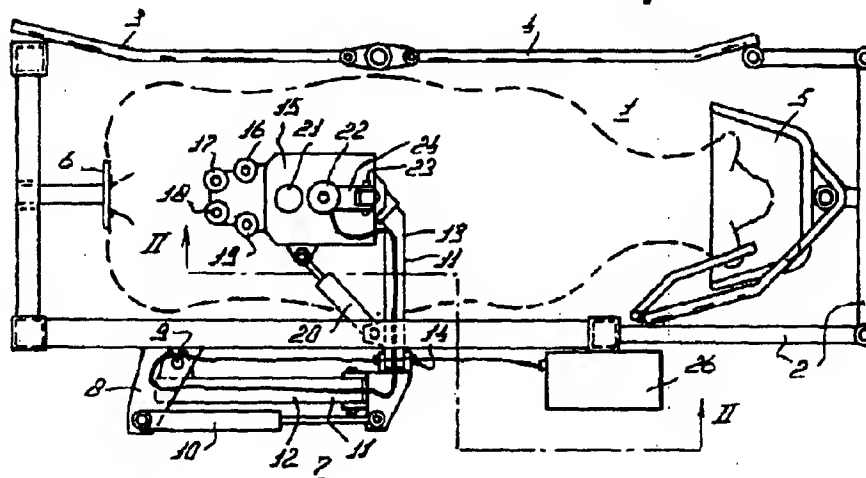
(74) Representative: Mulder, Herman et al
Octrooibureau Van der Lely N.V.
Weverskade 10
NL-3155 PD Maasland (NL)

(54) A construction for milking cows.

(57) A construction for milking cows includes measuring equipment (22 - 26), by means of which the flow rate of the blood and/or optionally further properties of the cow, such as, for example, the heart beat, can be determined. For that purpose, the measuring equipment (22 - 26) includes a sensor (22)

which, preferably during milking, can be moved against the cow and a computer (26) for processing the signals supplied by this sensor (22) and for optionally displaying the measured quantities or the data derived therefrom on a display screen.

FIG. 1



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The present invention relates to a construction for milking cows.

More in particular when such a construction is implemented as a fully automated and robotized milking installation, in which teat cups are automatically connected to the teats and milking is effected automatically, it is important that means for checking whether the milk is obtained from a cow being ill or from a healthy cow, will be available.

Therefore, according to the invention, the construction for milking cows is provided with measuring equipment, by means of which the flow rate of the blood of a cow can be measured. This measuring equipment can more in particular include an ultrasonic sensor. Such a sensor can be moved against the cow, preferably when the cow has entered the milking parlour and more specifically during milking, to ensure that reliable data can be obtained via the sensor. A practical solution is obtained when the sensor is provided with a spring.

In accordance with a further feature of the invention, the construction is provided with a spring-loaded sensor for measuring the blood of the cow; it is of advantage if the flow rate of the blood, and further relevant values, such as the heart beat, the blood pressure, etc. will be tested.

When the construction includes a milking robot having a robot head which acts as a carrier for one or more teat cups, then an advantageous embodiment is obtained by providing the sensor on the robot head. In a specific embodiment, the sensor can then be positioned, relative to the teat cups, behind a laser unit present on the robot head for determining the position of the cow's teats. When the robot head has then been moved to under the cow's udder and the teat cups have been connected to the teats of the cow's udder, the robot head can be kept under the cow in such a manner that the sensor, in particular when it is spring-loaded, can be moved against the underside, more specifically the abdomen, of the cow. The direct contact of the sensor with the cow renders it possible to obtain a reliable indication from the measured quantities recorded by the sensor about the health condition and/or about the extent to which the cow is in heat or about her pregnancy. For the processing of the signals received from the sensor use is made of a computer or optionally, when an automated and robotized milking installation is present, of the computer already present for that purpose. The quantities measured and the data derived therefrom can then simply be displayed on a screen associated with the computer.

For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:

Figure 1 is a plan view of a construction for milking cows in accordance with the invention, and

Figure 2 is a partial side view of this construction.

The construction shown in Figure 1 for milking cows shows a milking parlour 1 which is surrounded by a rail system 2, one longitudinal side of which is provided with a door 3 through which the cow can enter the milking parlour and a door 4 through which the cow can leave same. At its leading side, the milking parlour is provided in known per se manner with a feeding trough, in order that the cow present in the milking parlour can be supplied, preferably automatically, during milking with an appropriate quantity of fodder. Known per se means 6 for keeping the cow in the longitudinal direction in a more or less predetermined position during milking are shown schematically in Figure 1. At the longitudinal side of the milking parlour 1 opposite the one in which the doors 3 and 4 are located, there is arranged a milking robot 7. This milking robot may be of the type as, for example, described in the European patent application 0 360 354 or 0 519 544. Shown schematically, the milking robot includes a portion 8 which moves in the longitudinal direction of the milking parlour and a robot arm 11 which by means of an operating cylinder 10 is pivotal relative to this portion 8 about a shaft 9, which robot arm comprises two portions, a first portion 12 being directly coupled to the portion 8 that moves in the longitudinal direction and a second portion 13 being at a square angle to the robot arm portion 12 and being movable relative to the portion 12 about a predominantly horizontal shaft 14. The motional feature mentioned last is provided to enable the robot arm portion 13 to yield when the cow hits the robot arm with its legs and would thus damage it. The milking robot additionally includes a robot head 15, which acts as a carrier for the teat cups 16 - 19 and can be pivoted with the aid of an operating cylinder 20 relative to the end of the portion 13 of the robot arm. The robot head 15 further includes a laser unit 21 for determining the position of the teats of the cow's udder. The teat cups 16 - 19 are disposed in a slightly V-shaped position at the end of the robot head 15, while the laser unit is placed in front of the space present between the teat cups. In a position which relative to the teat cups 16 - 19 is behind the laser unit 21 there is arranged a sensor 22, more specifically on a holder 24 which is pivotal about a horizontal pin 23, while furthermore a spring 25 is present for keeping the sensor 22 without counter-pressure in an upwardly pushed position. The sensor 22 is of such a design that with the aid thereof predetermined properties of the cow can be recorded, such

as, for example, the flow rate of the blood and/or the heart beat and/or the blood pressure, etc. In the present embodiment, the sensor is designed as an ultrasonic sensor which, when pushed in the correct position against the cow, is capable of recording sounds in the body, and more specifically particular sounds in the relevant blood vessels. The sensor 22 co-operates with a computer 26 which, in Figure 1, is positioned at the side of the milking parlour. By means of the measuring equipment constituted by the sensor 22 and the computer 26 quantities such as the blood flow rate, the heart beat or the blood pressure can be measured, whilst with the aid of the computer data can be derived from the measured quantities about the health condition and/or the degree of heat or pregnancy of a cow. The quantities measured as well as the data derived therefrom can be displayed on a display screen which is not shown in the drawings but constitutes part of the computer. When for the benefit of the milking operation the robot arm is automatically pivoted to under the cow to a position under the cow's udder obtained, for example, with the aid of a cow identification system and subsequent thereto the position of the teats has accurately been determined by means of the laser unit, the teat cups 16 - 19 can be connected to the cow's teats. The robot head is then adjusted to such a height that by means of a horizontally emitted laser beam the laser unit can determine the position of the teats, at which height level the spring-loaded sensor 22 pushes against the abdominal region of the cow. After the teat cups 16 - 19 have been moved upwardly and have been connected to the teats, the robot head can be maintained in the same position under the cow, so that the spring-loaded sensor continues to be pushed against the abdominal region of the cow, and more specifically for such a long period of time as is required or desired for collecting the desired data. In the embodiment described here, the sensor 22 is disposed on the robot head 15, as then the sensor can be brought into contact with the cow in a suitable location. It is of course possible to dispose the sensor on a separate movable arm and to bring it into contact with the cow independently of the milking robot. It will also be obvious that the structure of the milking parlour and the type of milking robot are not of vital importance. The drawings only show a preferred embodiment for the location of the sensor 22.

Claims

1. A construction for milking cows, characterized in that the construction includes measuring equipment (22 - 26), by means of which the flow rate of the blood of a cow can be mea-

sured.

2. A construction as claimed in claim 1, characterized in that the measuring equipment includes an ultrasonic sensor (22).
3. A construction as claimed in claim 2, characterized in that the sensor (22) can be moved against the cow during milking.
4. A construction as claimed in claim 2 or 3, characterized in that the sensor (22) is provided with a spring (25).
5. A construction for milking cows, such as cows, characterized in that a spring-loaded sensor (22, 25) is present for measuring the blood of the cow, such as the flow rate of the blood, the heart beat, the blood pressure, etc.
6. A construction as claimed in any one of claims 2 to 5, characterized in that the construction includes a milking robot (7) having a robot head (15) which functions as a carrier for one or more teat cups (16 - 19), the sensor (22) being disposed on this robot head (15).
7. A construction as claimed in any one of claims 2 to 6, characterized in that the sensor (22) is positioned, relative to the teat cups (16 - 19), behind a laser unit (21) present on the robot head (15) for determining the position of the teats of an cow's udder.
8. A construction as claimed in any one of claims 2 to 7, characterized in that by means of the sensor (22) there can be obtained an indication about the health condition and/or the extent to which a cow is in heat or is pregnant.
9. A construction as claimed in any one of claims 2 to 8, characterized in that, when the robot head (15) has been moved to under the the cow's udder and the teat cups (16 - 19) have been connected to the teats of the cow's udder, the robot head (15) is kept under the cow in such a position that the sensor (22) is pushed against the underside, more specifically against the abdomen, of the cow.
10. A construction as claimed in any one of claims 2 to 9, characterized in that the measuring equipment (22 - 26) includes a computer (26) for processing the signals supplied by the sensor (22) and for displaying the measured quantities and/or the data derived therefrom on a screen.

FIG. 1

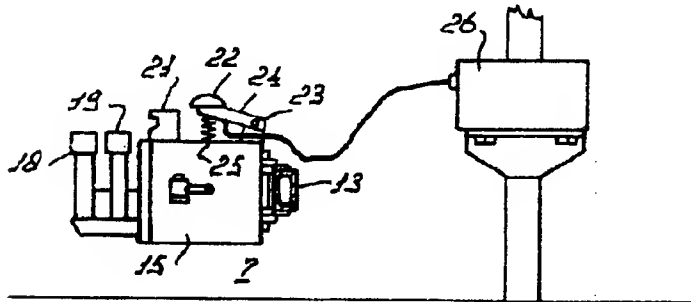
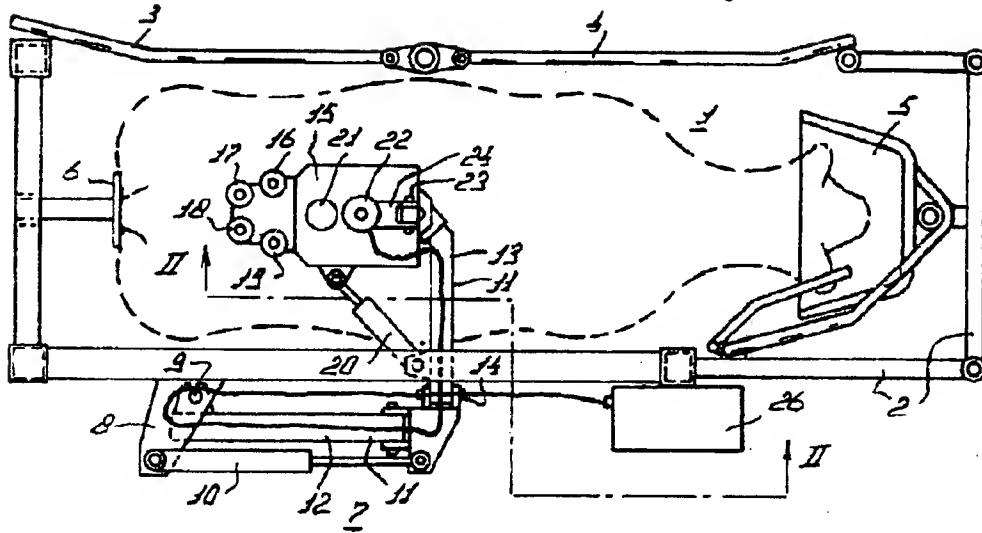


FIG. 2



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 93 20 2948

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
D,A	EP-A-0 360 354 (VAN DER LELY) * claims; figures * ---	1	A01J7/00
A	DATABASE WPI Week 9202, Derwent Publications Ltd., London, GB; AN 92-015480 & SU-A-1 644 831 (LIVERMORE H F CORP) * abstract * ---	1	
A	US-A-4 726 322 (TORSIUS) * claims; figures * ---	1	
D,P, A	EP-A-0 519 544 (VAN DER LELY) * claims; figures * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			A01J A01K
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		28 January 1994	Piriou, J-C
CATEGORY OF CITED DOCUMENTS			
<div><div>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</div><div>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</div></div>			

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